EXPECTATIONS

Y10 Mathematics

SCHOOL RULES REFRESHER

- The language use in this classroom is English. At all times. I ask nicely, and then its negative comments sent to your form tutor and HOY.
- There is no talking while I am talking or interrupting me for a question. If you have a question, you should put up your hand.
- You cannot go to your locker during class or between classes.
- You cannot go to the bathroom during class. Do not ask. You can however, use the first 5 minutes of lesson time if necessary. But after that, you will be considered late.

SCHOOL RULES REFRESHER

- You should always be ready for class. Bring the necessary equipment to class, this includes your notebook, calculator and pens.
- Lessons start with laptops closed, and should only be opened when told. Only assigned laptop work should be completed. Any suspicion of doing other work or being off task, will be noted.
- If we are doing independent work and you want to listen to music, that is allowed but a privilege which can be taken away quickly.

On Friday, I will check your mathematics file/book. Make sure it is organised.

Behaviour Policy

1

Step 1

- 2 Negative Pastoral Comments

= Head of Year Detention

2

Step 2

- 2 Head of Year detentions

= SMT Detention
(Friday after school)

3

Step 3

- 2 SMT detentions

= Suspension from school

Multiple suspensions may result in permanent expulsion from St Louis

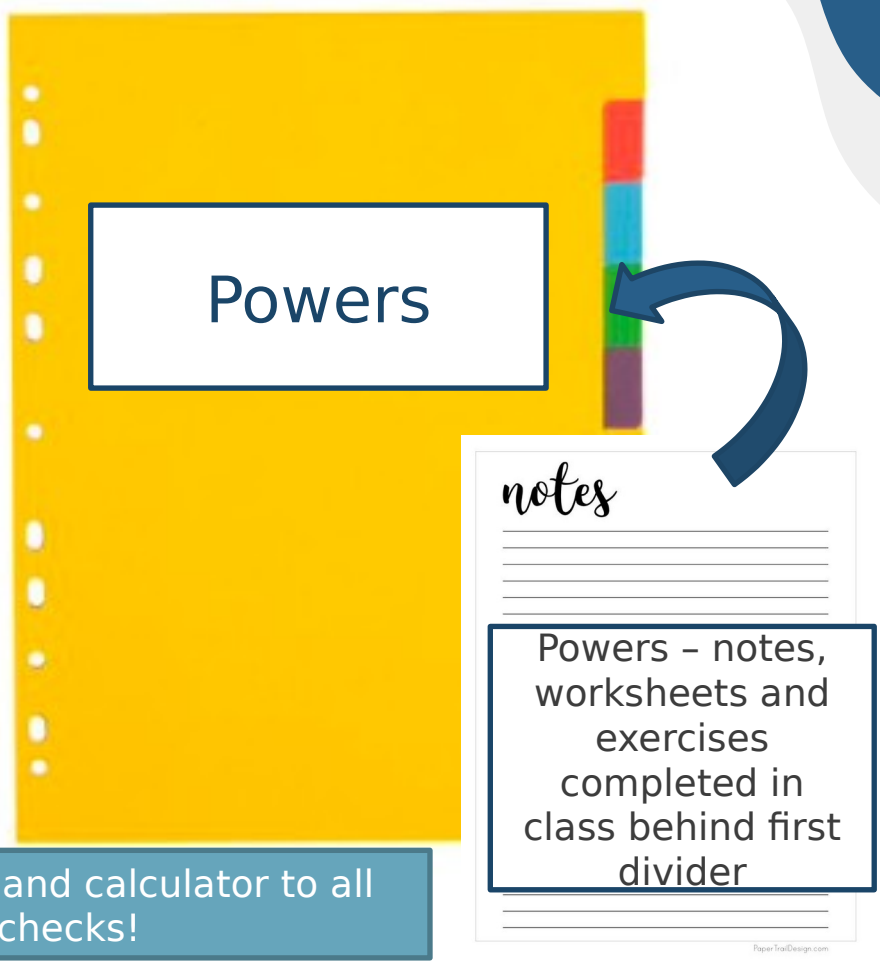
Powers

IGCSE Y10 Mathematics

0607

Math file

Fifth divider should be named *Powers* and all notes and worksheets from this section placed behind this divider



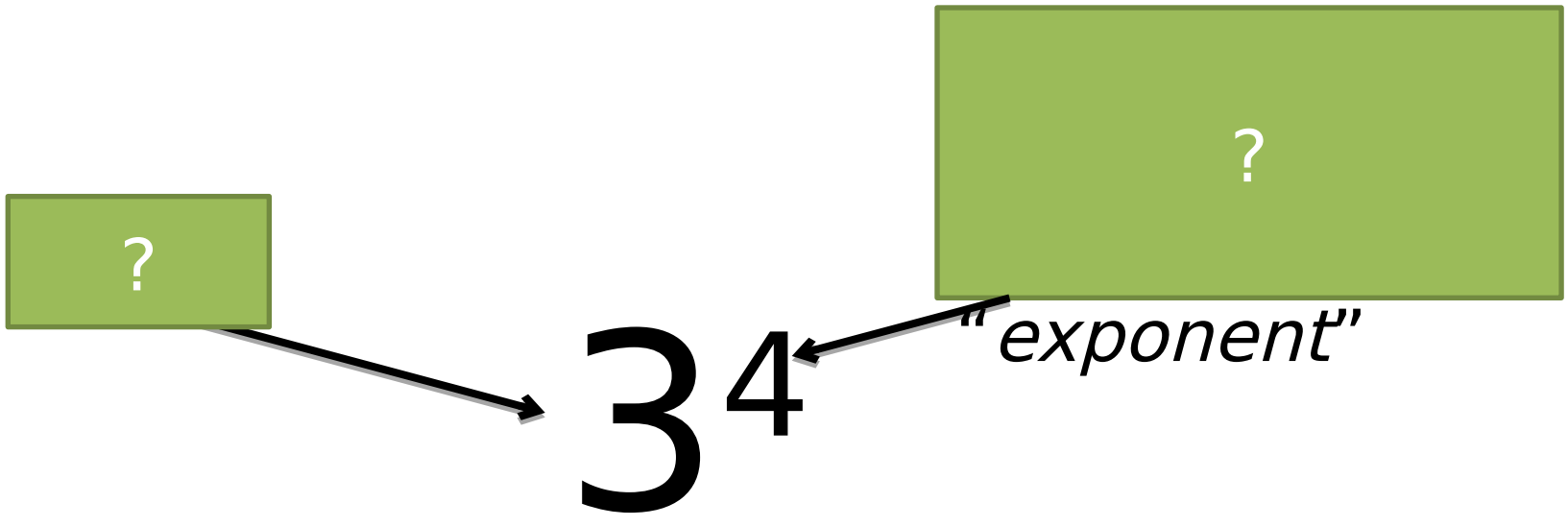
Bring your file, extra paper, stationery and calculator to all classes – there will be file checks!

Core & Extended:

- Meaning of exponents (powers, indices) in Z
- Standard Form
- Rules for exponents
- Simple indices – multiplying and dividing
- Meaning of exponents (powers, indices) in Q
- Indices – negative
- Indices - fractional

Terminology Recap

!



! We say this as "**3 to the power of 4**" or "**3 raised to the power of 4**" or "**3 to the 4**".

The whole expression is sometimes (confusingly) referred to as a '**power**' or '**power expression**'.

Multiplying Power Expressions with the Same Base

$3^5 \times 3^4$

How would I write this multiplication out in full? Therefore, how could I write the result of this multiplication in the form 3^k?

$3^{?}$

1st Law of Indices

!

$$a^b \times a^c = ?$$

$$a^{b+c}$$

Dividing power expressions with the same base

$$\frac{4^7}{4^2}$$

How would I write this multiplication out in full? Therefore, how could I write the result of this multiplication in the form 4^k?

$$4^{?}$$

2nd Law of Indices

!

$$\frac{a^b}{a^c} = a^{?}$$

$$c$$

Raising a power to a power

!

$$(4^2)^3$$

How would I write this multiplication out in full? Therefore, how could I write the result of this multiplication in the form 4^k?

$$4^{?}$$

3rd Law of Indices

!

$$(a^b)^c = a^{?c}$$

Zero and negative indices

3^0 3^{-1}

At this point, it doesn't make sense to say "Multiply 3 by itself negative 1 times". We'll have to use a different approach!

Is there a pattern we can see that will help us out?

$3^3 = 27$

$3^2 = 9$

$3^1 = 3$

$3^0 = 1$

$3^{-1} =$?

$3^{-2} =$?

Final Laws of Indices

!

$$a^1 = a$$

$$a^0 = 1$$

$$a^{-b} = \frac{1}{a^b}$$

Instructions: Everyone starts by standing up. You'll get a question with a time limit to answer. If you run out of time or get the question wrong, you stay standing.

War mup:

Start Question >

2^7 >

Start Question >

2^{12} >

a

Start Question >

$= 4^{-4}$

b

Start Question >

3^4

c

Start Question >

$9^{-} = 1$

d

Start Question >

10^{1}

10

e

Start Question >

$1^{-6} = 1$

f

Start Question >

DEATH

g

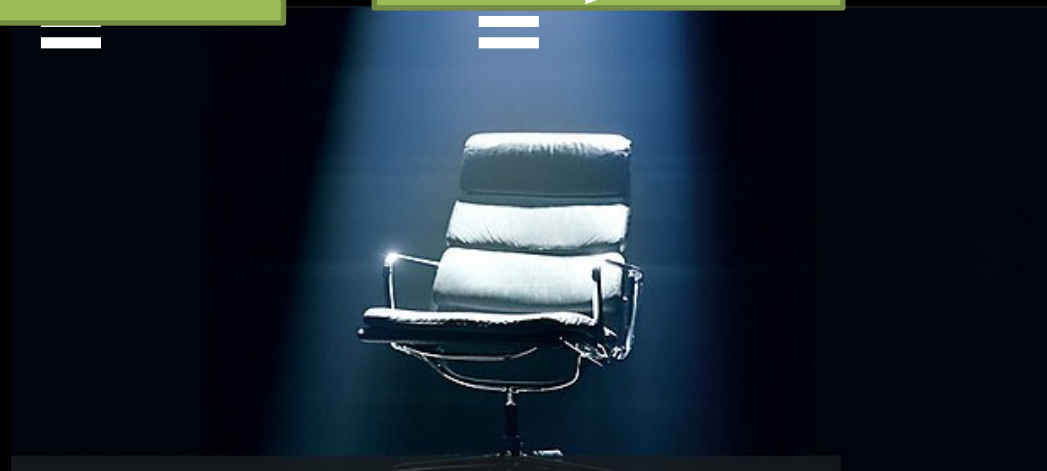
Start Question >

$=5^{0} =$

h

Start Question >

$=$



a

Start Question >

b

Start Question >

c

Start Question >

d

Start Question >

$= 5^6$

e

Start Question >

$= 2$

f

Start Question >

$= 4^{\square}$

^{2}

g

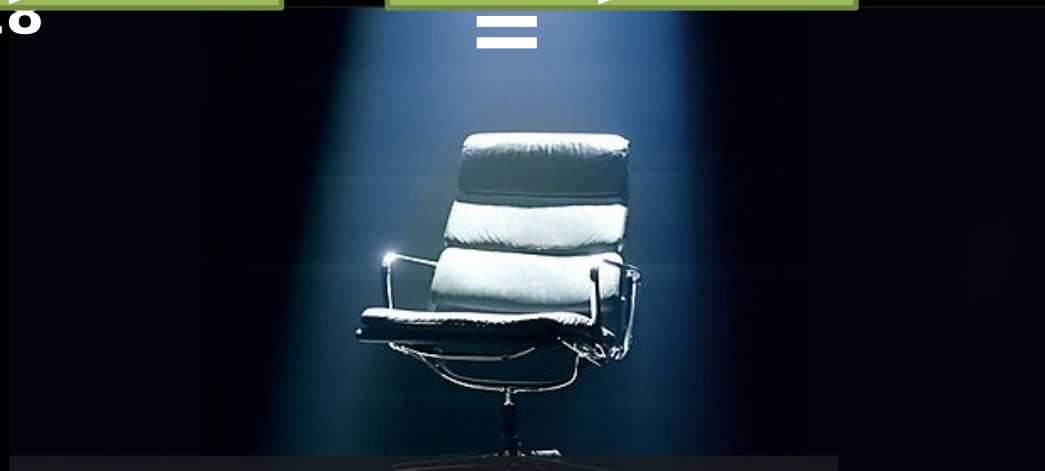
Start Question >

$= 2^{18}$

h

Start Question >

$=$



a

Start Question >

4^2

b

Start Question >

3^3

c

Start Question >

$(7^2$

d

Start Question >

5^1

e

Start Question >

3^2

f

Start Question >

$(7^2$

$)^1$

Challenges

1. What is half of ?

?

2. What is a ninth of ?

?

3. What is a quarter of ?

?

4. What is the square root of ?

?

5. What is x?

?

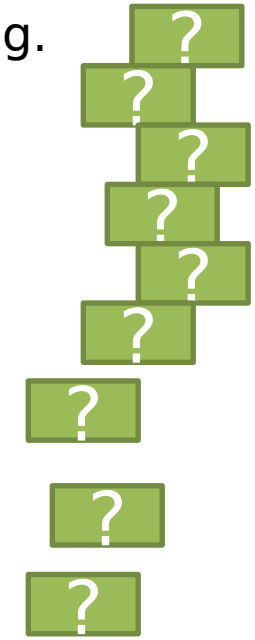
Exercise 1

Please ensure you write out the question.

1 Simplify the following.

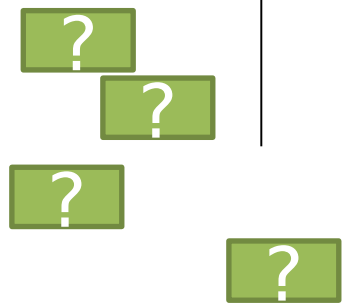
a)
b)
c)
d)
e)
f)
g)

i)



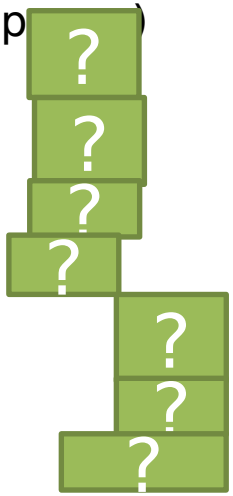
2 Simplify the following.

a)
b)
c)
d)



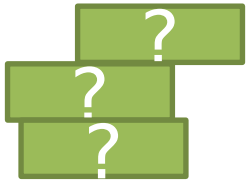
3 Evaluate the following (i.e. give as a fraction or integer with no p[illegible])

a)
b)
c)
d)
e)
f)
g)



4 Simplify the following.

a)
b)
c)



N

Solve

N

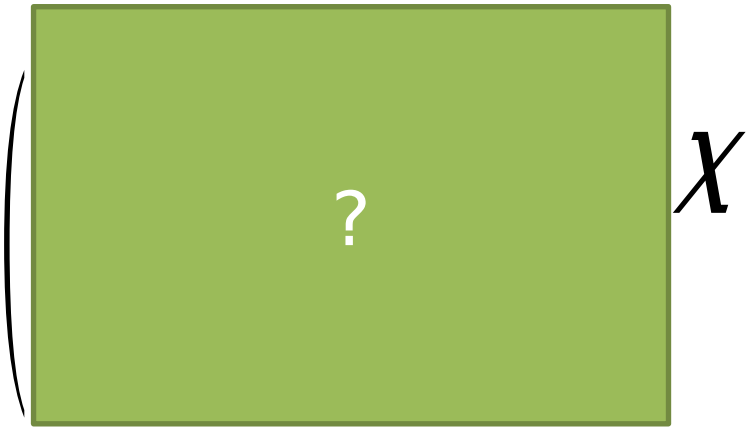
Given that , express as a single power of 4.

Changes of Base

Solve the following equation.

$$9^{10} = 3^{x}$$

(Hint: can we express 9 as a power of 3 perhaps?)



Express as a single power.

$$4^{x} \times 8^{x+1}$$

The strategy therefore is to find what both bases are a power of (e.g. 4 and 8 are both powers of 2), and replace them as such.

A few more examples...

Solve

$4^{x+1} = 8^3$

?

Solve

$125^{x+1} = 25^x$

?

Express as a single power of 3:

?

Test Your Understanding

$2^8 = 4^x$

$x =$?

$27^4 = 9^x$

$x =$?

$8^x = 4^{12}$

$x =$?

$3^x =$

$2x7$?

300

Express as a single power:

$3^{\square} \times 27^{\square - 1} =$?

Express as a single power:

$4^{10} \times 8^{\square} =$?

Exercise 2

Please ensure you write out the question.

Solve the following.

1 2 3 4 5 6

$2^x = 4^{10}$

?

Express as a single power.

1 2 3 4 5 N

$4^x \times 2^3 = 2^{4x+3}$

?

Solve the following.

7 8 9 10 11

$9^{x+1} = 27^x$

?